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Macroeconomic Impacts of COVID-19 on Nigeria: A DSGE Approach

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8.1. Introduction

Nigeria and indeed the entire world is experiencing a dreadful pandemic of an unprecedented magnitude is unknown to the human race in recent history. It is assumed a dimension of what can be tagged "World War III". It is a global health crisis that has adverse economic impact on the national and global economy. Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered virus called coronavirus. According to the World Health Organization (2020), most people infected with the virus experience mild to moderate respiratory illness and recover without requiring special treatment. However, older people and those with underlying medical conditions such as cardiovascular diseases, diabetes and cancer could experience serious illness. The disease was first identified in Wuhan, Hubei Province, China in December, 2019. By early days of January, 2020, it had become an endemic to mainland China.

Within three months, the localized Wuhan cases became an international concern with dire consequences on the world economies. This was similar to the Subprime mortgages in the USA that triggered the global financial crises of 2007-2009. Between January and mid-March 2020, it became clear that we live in a global village where "everything is in everything", only that now it is more striking than ever before.

In Nigeria, the shocks have created reverberating effects on the economy. Following shortfall in demand from China one of our major markets, coupled with other uncertainties in the oil market, quantity of oil demanded and international prices have been experiencing downward trend putting pressure on the monetary and fiscal policies. The fiscal authority had to envisage a review of the 2020 budget in view of the seriousness. In some specific terms, the Naira exchange rate to the US$ has faced strong attacks by the speculators. As at the mid-March 2020, the Central Bank of Nigeria (CBN) adjusted the exchange rate to N360:US$1 from N306:$1 in the official window but N380 on the Investors and Exporters (I&E) window. The consequences of the Naira depreciation on economic activities in the country is best imagined; higher cost of intermediate inputs at import will trigger higher imported inflation and, hence, higher domestic prices with consequential effects on the public who see it as an erosion of their real income and, by extension, their welfare.

Indeed Nigeria, Africa and the entire world is experiencing multiple shocks. According to IMF's World Economic Outlook (2020, April), Sub-Sahara Africa is facing triple shocks resulting from the health pandemic including: (1) Economic disruptions from the domestic health, leading to workplace closure, disruption in supply chain, lockdowns in the absence of social safety nets, loss of income and heightened uncertainties; (2) Spill-over from the global fallout of COVID-19 in terms of trade shocks, tighter global financial conditions and decrease in remittance flows following the projected slowdown in global growth; and (3) Commodity price shocks as many resource-intensive countries are facing decline in commodity prices thus compounding already challenged economic situation. Added to these are idiosyncratic factors including structural constraints, policy adjustment as well as climate and other natural shocks.

According to Pollitt (2020), "diseases and the economy both owe their existence to human interactions. If people dont come into close contact, diseases will not be able to survive. We would also have no trade and no economy[11]. Hence, with the lockdowns across nations of the earth, the world economic activity curve has become asymptotical to the horizontal line, thus provoking negative GDP growth rate everywhere.

Therefore, in the course of COVID-19 pandemic and other shocks directly related to or tangential to it including: (1) International oil price; (2) Government expenditure; (3) Government revenue; (4) Monetary policy; (5) Generic business cycle shocks; and (6) Technology shocks are implemented within a Dynamic Stochastic General Equilibrium (DSGE) framework with a view to providing insights into short to medium term economic outlook/forecast of the economy. The standard DSGE model is adapted in view of its characteristics of being micro-founded, monopolistic competition, non-neutrality of money, sticky wages and prices and ability to capture uncertainties/shocks. Full details of this is presented in Section 3 .

After Section 1 which is on the introduction, follow Section 2 which deals with a brief literature review and some stylized facts, while Section 3 describes the COVID-19 pandemic DSGE approach. In Section 4, the data and policy scenarios are discussed and Section 5 focuses on presentation and discussion of the results under various scenarios. Section 6 contains policy implications and conclusion.

8.2 Literature Review and some Stylized Facts

Theoretical and empirical studies that relate population health to macroeconomic variables abound. Indicators of health that relate to COVID-19 are morbidity and mortality. The adverse effects of both morbidity and mortality could be felt at individual, household, firm, national as well as global levels. The consequences of morbidity and mortality arising from COVID-19 have several macroeconomic implications. These include; loss of government revenue, increase in public expenditure, inflation, unemployment, reduction in savings, fall in investment and slow or negative economic growth. The need to conduct empirical studies to guide policymakers cannot be overemphasized. However, results from such studies upon which policy prescriptions are made depend largely on the method of analyses. This section reviews studies relating to global pandemics in general, and COVID-19 in particular to macroeconomic variables.

Finlay (2007) found that improvement in health have significant as well as direct and indirect positive effect on economic growth while applying